S

Up to 2.72x the data processing speed

on 8-vCPU VMs*

M

Up to 2.61x the data processing speed

on 16-vCPU VMs*

L

Up to 2.09x the data processing speed

on 32-vCPU VMs*

Process data analytics queries faster with new Microsoft Azure Lsv3-series VMs featuring 3rd Gen Intel Xeon Scalable processors

Compared to Lsv1-series VMs featuring older Intel Xeon processors, the newer VMs completed Microsoft SQL Server data queries in less time

It might be nice to imagine a world where your business could succeed purely on the instincts of decision makers. In reality, however, the choices that control day-to-day operations require the right information at the right time. For many businesses, that information comes in the form of reports and insights generated by robust data analytics applications. When using the cloud to run these applications, VMs that quickly complete analysis jobs can help you get a head start on the decision-making process.

We tested data warehouse analytics performance on two types of Microsoft Azure VMs running Microsoft SQL Server 2019 databases: Lsv3-series VMs featuring 3rd Gen Intel® Xeon® Scalable processors and Lsv1-series VMs featuring older Intel Xeon processors. Across each of the three VM sizes we tested, the latest-generation Lsv3-series VMs consistently completed the workloads more than twice as fast. This speed increase could deliver vital insights faster, enabling your business with information to make decisions sooner.

**compared to Lsv1-series VMs*

How we tested

We tested two generations of Azure VMs at three sizes:

- Lsv3-series VMs featuring 3rd Gen Intel Xeon Platinum 8370C processors
- Lsv1-series VMs featuring older Intel Xeon E5-2698B v3 processors

Figure 1 shows the size specifications of the VMs we tested.

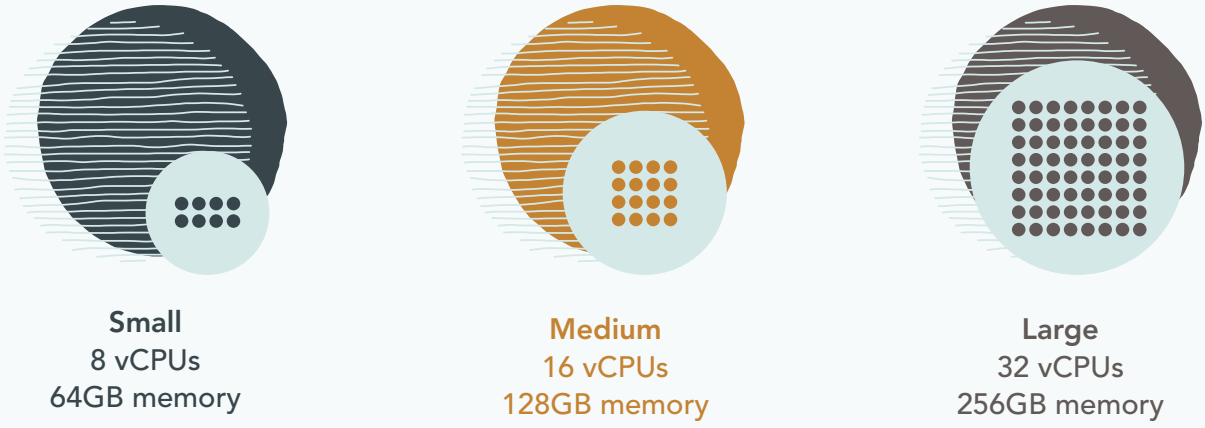

Figure 1: Key specifications of the Microsoft Azure Lsv3- and Lsv1-series VMs we tested. Source: Principled Technologies.

To test the capabilities of these storage-optimized VMs, we used a 1TB database, which was much larger than the memory capacity of any of the VMs. Therefore, the workloads we ran affected both processors and storage. The Lsv3-series VMs used direct-attached NVMe™ drives. The Lsv1-series VMs used network-attached premium SSDs, which was the best available disk configuration that we could use, as Azure ultra disks are not compatible with the Lsv1-series VMs. For both VM types, we striped the drives into a single logical volume. For Lsv1-series VMs, we chose as many 2TB disks as we would need to hit the VMs' IOPS limits. We made this choice because it was closest in capacity to the 1.92TB NVMe drives of the Lsv3-series, and because we felt it provided a good balance of value for the IOPS, throughput, and capacity they provided.

We tested the Lsv3-series VMs in the South Central US region. We chose to test the Lsv1-series VMs in the East US 2 region because it was the closest available to the South Central US region at the time of testing.

For additional configuration information, see the science behind the report.

About the HammerDB workload we used

The TPROC-H workload from the HammerDB benchmark suite is an online analytics processing (OLAP) workload. This test measures the time required for VM instances to analyze streams of database queries, where one stream comprises 22 serialized database queries. While the HammerDB developers derived TPROC-H from the TPC-H specification, the workload is not a full implementation of the TPC-H standard. As such, the results in this paper are not directly comparable to officially published TPC-H results.

For more information, visit https://www.hammerdb.com/docs/ch11s01.html.

Our results

We tested each VM with one and seven streams of database queries. In Figures 2 through 4, we illustrate the results for small, medium, and large VMs. At each VM size, we found that the Lsv3-series VMs with 3rd Gen Intel Xeon Scalable processors analyzed data more than twice as fast. For small VMs, the Lsv3-series VMs processed the workload with up to 2.72 times the speed of their Lsv1-series counterparts. Similarly, the medium Lsv3-series VMs presented a performance increase of up to 2.61 times; the large VMs, up to 2.09 times.

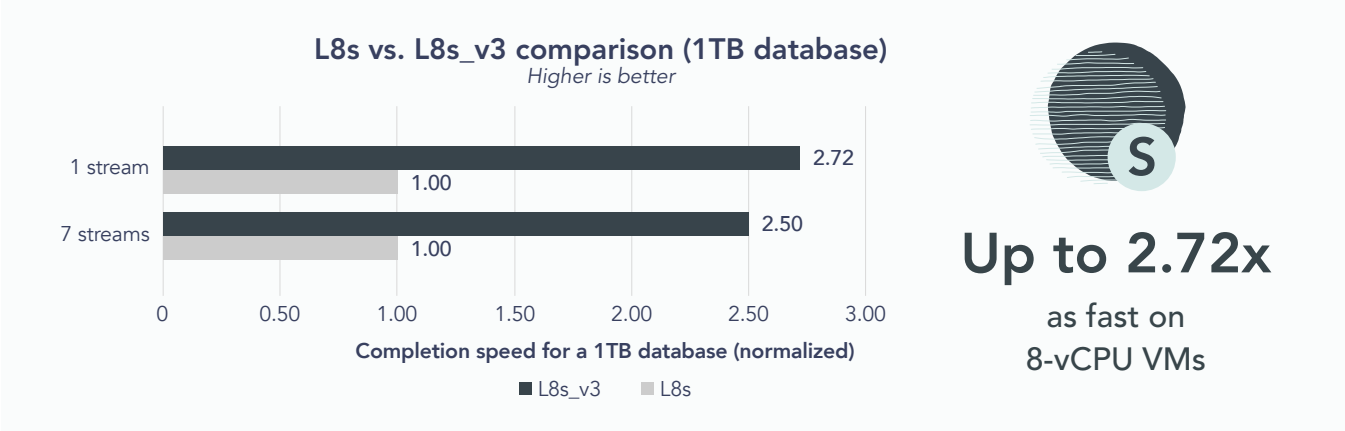

Figure 2: Comparison of the speed at which each of the small Lsv3 VMs completed the TPROC-H analytics workload, relative to the completion time of the Lsv1 VMs. Greater speed is better. Source: Principled Technologies.

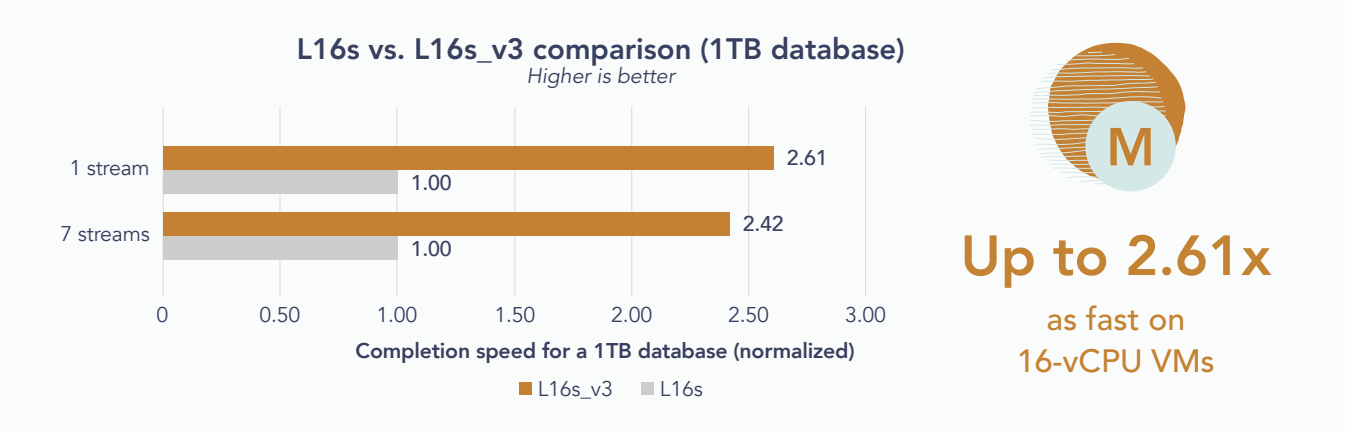

Figure 3: Comparison of the speed at which each of the medium Lsv3 VMs completed the TPROC-H analytics workload, relative to the completion time of the Lsv1 VMs. Greater speed is better. Source: Principled Technologies.

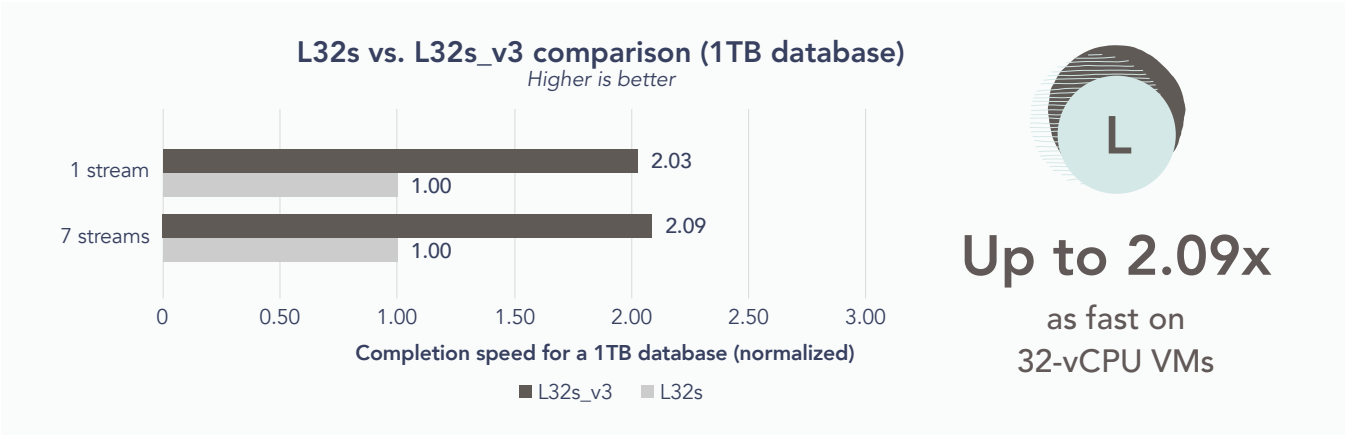

Figure 4: Comparison of the speed at which each of the large Lsv3 VMs completed the TPROC-H analytics workload, relative to the completion time of the Lsv1 VMs. Greater speed is better. Source: Principled Technologies.

Real-world context: Hypothetical use case

Imagine a company has a five-hour window each night in which to analyze data on a 1TB database. Because executives and other leaders rely on the analysis to help focus their business improvement efforts each day, this analysis must complete before sunrise.

Based on the results of our single-stream TPROC-H tests, the 32-vCPU Lsv3 VM with 3rd Gen Intel Xeon Scalable processors would enable this company to complete 41 query streams within their nightly analysis window. However, the Lsv1 VM with the same vCPU count would allow time to complete only 19 query streams.

Looking at it another way, let's say this company needs only complete 19 query streams total on the 1TB database. While the Lsv1 VM would require 4.8 hours to analyze that data, the Lsv3 VM would complete the same task in 2.3 hours. This would shrink their analysis window each night to less than half of what it was. Over the course of a year, this hypothetical company could save over 900 hours of analysis time per year by choosing the Lsv3-series VMs—and could see significant cost savings on VM uptime.

About Microsoft Azure Lsv3-series VMs

New storage-optimized Azure Lsv3-series VMs feature 3rd Generation Intel Xeon Scalable processors in hyperthreaded configurations. According to Microsoft, the VMs also offer the following specifications:[1]

- Up to 80 vCPUs and up to 800 GiB of RAM
- All-core turbo clock speed of up to 3.5GHz
- Intel Turbo Boost Technology
- Intel Advanced Vector Extensions 512 (Intel AVX-512)
- Intel Deep Learning Boost

To learn more, visit https://docs.microsoft.com/en-us/azure/virtual-machines/lsv3-series.

Conclusion

Although business leaders can't rely purely on business acumen to make critical decisions, they can make the most of their abilities with quick insights. In our tests on Azure VMs across three sizes, we found that newer Lsv3-series VMs with 3rd Gen Intel Xeon Scalable processors analyzed query streams more than twice as fast as Lsv1-series VMs with older processors. This performance increase could enable you to achieve insights more quickly and implement solutions that might help your business gain a competitive edge.

1. "Lsv3-series," accessed June 3, 2022, https://docs.microsoft.com/en-us/azure/virtual-machines/lsv3-series.

Read the science behind this report at https://facts.pt/n9x7LR0 ▶

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